

Art Unit: 2183

CLMPTO
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AMENDMENT

1. (Previously Amended) An electrostatic discharge (ESD) protection network, comprising:

an inductor having a plurality of turns in the shape of a coil, the plurality of turns having an inductance; and

a plurality of electrostatic discharge (ESD) clamp devices, each one of said plurality of ESD clamp devices having a parasitic capacitance, said plurality of ESD clamp devices being connected to a corresponding one of said plurality of turns of said inductor, the inductance of said turns and the parasitic capacitance of said ESD clamp devices thereby forming a low pass filter.

2. (Previously Amended) The ESD protection network of claim 1, wherein said plurality of turns and said plurality of ESD clamp devices are fabricated on a surface selected from the group consisting of a substrate and an integrated circuit die.

3. (Previously Amended) The ESD protection network of claim 1, wherein said plurality of turns and said plurality of ESD clamp devices are fabricated on an integrated circuit die.

4. (Previously Amended) An integrated circuit apparatus having an electrostatic discharge (ESD) protection network, said apparatus comprising:

an integrated circuit substrate;

a first insulation layer over a face of said integrated circuit substrate;

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a plurality of conductive layers, each of the plurality of conductive layers in the shape of a coil turn, the coil turn having a first and second end;

a plurality of insulation layers interleaved between the plurality of conductive layers;

a one of said plurality of conductive layers proximate to said first insulation layer and the other ones of said plurality of conductive layers stacked over the one with said plurality of insulation layers interleaved therebetween;

a plurality of vias in the plurality of insulation layers, the plurality of vias connecting adjacent ones of the coil turns of said plurality of conductive layers, thereby forming an inductor coil; and

a plurality of electrostatic discharge (ESD) clamp devices, each one of said plurality of ESD clamp devices having a parasitic capacitance, said plurality of ESD clamp devices being connected to a corresponding one of the coil turns of said plurality of conductive layers, thereby forming a low pass filter.

5. (Original) The apparatus of claim 4, wherein respective ones of said plurality of conductive vias connect the second ends of each one of the coil turns of said plurality of conductive layers to the first ends of each of the adjacent ones of the coil turns of said plurality of conductive layers, thereby forming the inductor coil.

6. (Original) The apparatus of claim 5, wherein each of the respective ones of said plurality of conductive vias is at least one via.

7. (Original) The apparatus of claim 5, wherein each of the respective ones of said plurality of conductive vias is two or more vias so as to reduce electrical connection resistance thereof.

8. (Original) The apparatus of claim 4, wherein the shape of the coil turns of said plurality of conductive layers is selected from the group consisting of round, square, rectangle, triangle, oval, hexagon and octagon.

9. (Original) The apparatus of claim 4, wherein said plurality of conductive layers is made of metal.

10. (Original) The apparatus of claim 9, wherein the metal is selected from the group consisting of copper, aluminum, copper alloy and aluminum alloy.

11. (Original) The apparatus of claim 1, wherein said plurality of conductive layers is made of conductive doped polysilicon.

12. (Original) The apparatus of claim 4, further comprising a magnetic material interposed concentrically inside of an inner diameter of the coil turns of said plurality of conductive layers so as to increase the inductance thereof.

13. (Original) The apparatus of claim 12, wherein the magnetic material is selected from the group consisting of iron, iron oxide, ferrite ceramic and ferrous oxide.

14. (Original) The apparatus of claim 4, wherein at least one ESD claim device is connected to each one of said plurality of conductive layers.

15. (Original) The apparatus of claim 4, wherein at least one of said plurality of conductive layers is connected to a one of said plurality of ESD claim devices.

16. (Original) The apparatus of claim 4, wherein said plurality of ESD claim devices are fabricated in said integrated circuit substrate and connected to said plurality of conductive layers with vias through said plurality of insulation layers.

17. (Original) The apparatus of claim 4, wherein said plurality of ESD claim devices are fabricated on at least one of said plurality of insulation layers and connected to said plurality of conductive layers with vias through said plurality of insulation layers.

18. (Previously Amended) A method for providing an electrostatic discharge (ESD) protection network, comprising:

forming a plurality of conductive layers and a plurality of insulation layers, wherein said plurality of conductive layers and said plurality of insulation layers are interleaved, wherein each of the conductive layers is formed in the shape of a coil turn having an inductance such that each of the coil turns has a first and a second end;

forming a plurality of vias in said plurality of insulation layers, the plurality of vias being located between the ends of adjacent coil turns wherein conductive material is formed in said plurality of vias thereby connecting the first end of one coil turn to the second end of the adjacent coil turn;

providing a plurality of electrostatic discharge (ESD) clamp devices, each one of said plurality of ESD clamp devices having a parasitic capacitance; and

connecting said plurality of ESD clamp devices to a corresponding one of the coil turns of said plurality of conductive layers, thereby forming a low pass filter.

19. (Original) The method of claim 18, wherein the step of connecting said plurality of ESD clamp device comprises the step of connecting at least one ESD clamp device to each one of said plurality of conductive layers.

20. (Original) The method of claim 18, wherein the step of connecting said plurality of ESD clamp devices comprises the step of connecting at least one of said plurality of conductive layers is to a one of said plurality of ESD clamp devices.